

SYRINGE PUMP

[0001] The present application is a continuation of U.S. patent application Ser. No. 15/059,394, filed Mar. 3, 2016, and entitled Syringe Pump, now U.S. Publication No. US-2016-0184510-A1, published Jun. 30, 2016 (Attorney Docket No. R46), which is a continuation of Ser. No. 13/724,568, filed Dec. 21, 2012, and entitled Syringe Pump, now U.S. Pat. No. 9,295,778, issued Mar. 29, 2016 (Attorney Docket No. J75), which is a Non-Provisional application which claims priority to and the benefit of the following:

[0002] U.S. Provisional Patent Application Ser. No. 61/578,649, filed Dec. 21, 2011 and entitled System, Method, and Apparatus for Infusing Fluid (Attorney Docket No. J02);

[0003] U.S. Provisional Patent Application Ser. No. 61/578,658, filed Dec. 21, 2011 and entitled System, Method, and Apparatus for Estimating Liquid Delivery (Attorney Docket No. J04);

[0004] U.S. Provisional Patent Application Ser. No. 61/578,674, filed Dec. 21, 2011 and entitled System, Method, and Apparatus for Dispensing Oral Medications (Attorney Docket No. J05);

[0005] U.S. Provisional Patent Application Ser. No. 61/679,117, filed Aug. 3, 2012 and entitled System, Method, and Apparatus for Monitoring, Regulating, or Controlling Fluid Flow (Attorney Docket No. J30); and

[0006] U.S. Provisional Patent Application Ser. No. 61/651,322, filed May 24, 2012 and entitled System, Method, and Apparatus for Electronic Patient Care (Attorney Docket No. J46), each of which is hereby incorporated herein by reference in its entirety.

[0007] U.S. patent application Ser. No. 13/724,568, filed Dec. 21, 2012, and entitled Syringe Pump, now U.S. Pat. No. 9,295,778, issued Mar. 29, 2016 (Attorney Docket No. J75) is also a Continuation In Part Application of the following:

[0008] U.S. patent application Ser. No. 13/333,574, filed Dec. 21, 2011 and entitled System, Method, and Apparatus for Electronic Patient Care, now U.S. Publication No. US-2012-0185267-A1, published Jul. 19, 2012 (Attorney Docket No. 197), and

[0009] PCT Application Serial No. PCT/US11/66588, filed Dec. 21, 2011 and entitled System, Method, and Apparatus for Electronic Patient Care (Attorney Docket No. 197 WO), both of which are hereby incorporated herein by reference in their entireties.

[0010] U.S. patent application Ser. No. 15/059,394, filed Mar. 3, 2016, and entitled Syringe Pump, now U.S. Publication No. US-2016-0184510-A1, published Jun. 30, 2016 (Attorney Docket No. R46) may also be related to one or more of the following U.S. patent applications filed on Dec. 21, 2012, all of which are hereby incorporated herein by reference in their entireties:

[0011] Non-provisional application Ser. No. 13/723,238, entitled System, Method, and Apparatus for Clamping, now U.S. Pat. No. 9,759,369, issued Sep. 12, 2017 (Attorney Docket No. J47);

[0012] Non-provisional application Ser. No. 13/723,235, entitled System, Method, and Apparatus for Dispensing Oral Medications, now U.S. Pat. No. 9,400,873, issued Jul. 26, 2016 (Attorney Docket No. J74);

[0013] Non-provisional application Ser. No. PCT/US12/71131, entitled System, Method, and Apparatus for Dispens-

ing Oral Medications, now Publication No. WO-2013/096718, published Jun. 27, 2013 (Attorney Docket No. J74WO);

[0014] Non-provisional application Ser. No. 13/725,790, entitled System, Method, and Apparatus for Infusing Fluid, now U.S. Pat. No. 9,677,555, issued Jun. 13, 2017 (Attorney Docket No. J76);

[0015] PCT application Ser. No. PCT/US12/71490, entitled System, Method, and Apparatus for Infusing Fluid, now Publication No. WO-2013/096909, published Jun. 27, 2013 (Attorney Docket No. J76WO);

[0016] Non-provisional application Ser. No. 13/723,239, entitled System, Method, and Apparatus for Electronic Patient Care, now U.S. Pat. No. 10,108,785, issued Oct. 23, 2018 (Attorney Docket No. J77);

[0017] Non-provisional application Ser. No. 13/723,242, entitled System, Method, and Apparatus for Electronic Patient Care, now U.S. Publication No. US-2013-0317753-A1, published Nov. 28, 2013 (Attorney Docket No. J78);

[0018] Non-provisional application Ser. No. 13/723,244, entitled System, Method, and Apparatus for Monitoring, Regulating, or Controlling Fluid Flow, now U.S. Pat. No. 9,151,646, issued Oct. 6, 2015 (Attorney Docket No. J79);

[0019] PCT application Ser. No. PCT/US12/71142, entitled System, Method, and Apparatus for Monitoring, Regulating, or Controlling Fluid Flow, now Publication No. WO-2013/096722, published Jun. 27, 2013 (Attorney Docket No. J79WO);

[0020] Non-provisional application Ser. No. 13/723,251, entitled System, Method, and Apparatus for Estimating Liquid Delivery, now U.S. Pat. No. 9,636,455, issued May 2, 2017 (Attorney Docket No. J81);

[0021] PCT application Ser. No. PCT/US12/71112, entitled System, Method, and Apparatus for Estimating Liquid Delivery, now Publication No. WO-2013/096713, published Jun. 27, 2013 (Attorney Docket No. J81WO); and

[0022] Non-provisional application Ser. No. 13/723,253, entitled System, Method, and Apparatus for Electronic Patient Care, now U.S. Publication No. US-2013-0191513-A1, published Jul. 25, 2013 (Attorney Docket No. J85).

BACKGROUND**Relevant Field**

[0023] The present disclosure relates to pumps. More particularly, the present disclosure relates to a system, method, and apparatus for estimating liquid delivery of a syringe pump.

Description of Related Art

[0024] Syringe pumps are used in a variety of medical applications, such as for intravenous delivery of liquid medications, for example a patient in an intensive-care unit (ICU), for an extended length of time. Syringe pumps may be designed so that needles, tubing, or other attachments are attachable to the syringe pump. Syringe pumps typically include a plunger mounted to a shaft that pushes a liquid out of a reservoir. The reservoir may be a tube-shaped structure having a port at one end such that the plunger can push (i.e., discharge) the liquid out of the syringe pump. Syringe pumps can be coupled to an actuator that mechanically drives the plunger to control the delivery of liquid to the patient.